

WHAT IS CLAIMED IS:

1. A liquid microemulsion useful as a thermal stabilizer for polyvinyl chloride resin and which exhibits a reduced amount of volatile components when heated comprising:

5 a) an overbased metal carbonate/carboxylate obtained from the reaction of an oxide and/or hydroxide of a metal selected from the group consisting of sodium, potassium, calcium, magnesium, zinc and mixtures thereof and an aliphatic acid in which the aliphatic moiety contains up to about 30 carbon atoms and carbon dioxide in an oil;

10 b) one or more non-phenolic compounds having about two or about three hydroxyl groups; and,

 c) one or more polyols, alcohol ethoxylates and/or alcohol propoxylates having from about 6 to about 24 carbon atoms in the alcohol, and 0 to 3 ethylene oxide units and/or 0 to 3 propylene oxide units.

15 2. The microemulsion of Claim 1 wherein the oil is a paraffinic oils having a boiling point higher than about 170°C.

 3. The microemulsion of Claim 1 further comprising an organic material which is readily soluble or miscible with the oil.

 4. The microemulsion of Claim 3 wherein the organic material is
20 selected from the group consisting of substituted aromatic hydrocarbons, unsubstituted aromatic hydrocarbons and ethoxylated alcohols.

 5. The microemulsion of Claim 1 wherein the equivalent ratio of basic metal compound to aliphatic acid is about 1 to about 10.

25

6. The microemulsion of Claim 1 wherein the aliphatic acid is selected from the group consisting of caprylic acid, capric acid, lauric acid, myristic acid, myristoleic acid, decanoic acid, dodecanoic acid, pentadecanoic acid, palmitic acid, palmitoleic acid, margaric acid, stearic acid, 12-hydroxystearic acid, oleic acid, ricinoleic acid, linoleic acid, arachidic acid, gadoleic acid, cicosadienoic acid, behenic acid, crucic acid, tall oil fatty acid, rapeseed oil fatty acid, linseed oil fatty acid and mixtures thereof.

7. The microemulsion of Claim 1 wherein component (b) is selected from the group consisting of glycerin, glycerol monooleate, ethylene glycol, diethylene glycol, triethylene glycol, propylene glycol, dipropylene glycol, tripropylene glycol, diethylene glycol monobutyl ether, triethanolamine, diethanolamine and ethanolamine.

8. The microemulsion of Claim 1 wherein component (c) is selected from the group consisting of sorbitol, pentaerythritol, sugar alcohols and mixtures thereof.

9. The microemulsions of Claim 1 wherein component (b) of the microemulsion is glycerin and component (c) is sorbitol.

10. The microemulsions of Claim 1 wherein component (b) is triethanolamine and component (c) is an ethoxylated alcohol.

11. The microemulsion of Claim 1 wherein the metal carboxylate of component (a) is obtained from calcium hydroxide and zinc oxide, the aliphatic acid of component (a) is oleic acid, component (b) is glycerin and component (c) is sorbitol.

12. The microemulsion of Claim 2 wherein the metal carboxylate of component (a) is obtained from calcium hydroxide and zinc oxide, the aliphatic acid of component (a) is talloil acid, component (b) is glycerin and component (c) is sorbitol.

5 13. A process for preparing a liquid microemulsion useful as a thermal stabilizer for polyvinyl chloride resin and which exhibits a reduced amount of volatile components when heated comprises the step of reacting in an oil, either simulataneously or sequentially, and in the presence of an acidic gas (a) an oxide and/or hydroxide of a metal selected from the group consisting of sodium, potassium,
10 calcium, magnesium, zinc and mixtures thereof, (b) an aliphatic acid in which the aliphatic moiety contains up to about 30 carbon atoms, (c) one or more non-phenolic compounds having about two or about three hydroxyl groups; and, (d) one or more polyols, alcohol ethoxylates and/or alcohol propoxylates having from about 6 to about 24 carbon atoms in the alcohol, and 0 to 3 ethylene oxide units and/or 0 to 3
15 propylene oxide units.

14. The process of Claim 13 wherein the oil is a parrafinic oils having a boiling point higher than about 170°C.

15. The process of Claim 13 further comprising an organic material which is readily soluble or miscible with the oil.

20 16. The process of Claim 15 wherein the organic material is selected from the group consisting of substituted aromatic hydrocarbons, unsubstituted aromatic hydrocarbons and ethoxylated alcohols.

17. The process of Claim 13 wherein the equivalent ratio of basic metal compound to aliphatic acid is about 1 to about 10.

25

18. The process of Claim 13 wherein the aliphatic acid is selected from the group consisting of caprylic acid, capric acid, lauric acid, myristic acid, myristoleic acid, decanoic acid, dodecanoic acid, pentadecanoic acid, palmitic acid, palmitoleic acid, margaric acid, stearic acid, 12-hydroxystearic acid, oleic acid, ricinoleic acid, linoleic acid, arachidic acid, gadoleic acid, cicosadienoic acid, behenic acid, crucic acid, tall oil fatty acid, rapeseed oil fatty acid, linseed oil fatty acid and mixtures thereof.

19. The process of Claim 13 wherein component (c) is selected from the group consisting of glycerin, glycerol monooleate, ethylene glycol, diethylene glycol, triethylene glycol, propylene glycol, dipropylene glycol, tripropylene glycol, diethylene glycol monobutyl ether, triethanolamine, diethanolamine and ethanolamine.

20. The process of Claim 13 wherein component (c) of the microemulsion is glycerin and component (d) is sorbitol.

21. The process of Claim 13 wherein component (c) of the microemulsion is triethanolamine and component (d) is an ethoxylated alcohol.

22. The process of Claim 13 wherein the acidic gas is carbon dioxide.

23. The process of Claim 13 wherein the temperature of the reaction is from about 100°C to about 220°C.

24. The process of Claim 13 wherein the basic metal calcium hydroxide and zinc oxide, the aliphatic acid is oleic acid or tall oil fatty acid, component (c) is glycerin and component (d) is sorbitol.

25. A halogen-containing polymer composition comprising a halogen-containing polymer and a heat stabilizing effective amount of a microemulsion comprising:

5 a) an overbased metal carbonate/carboxylate obtained from the reaction of an oxide and/or hydroxide of a metal selected from the group consisting of sodium, potassium, calcium, magnesium, zinc and mixtures thereof and an aliphatic acid in which the aliphatic moiety contains up to about 30 carbon atoms and carbon dioxide in an oil;

10 b) one or more non-phenolic compounds having about two or about three hydroxyl groups; and,

c) one or more polyols, alcohol ethoxylates and/or alcohol propoxylates having from about 6 to about 24 carbon atoms in the alcohol, and 0 to 3 ethylene oxide units and/or 0 to 3 propylene oxide units.

15 26. The halogen-containing polymer composition of Claim 25 wherein the halogen-containing polymer is a polyvinyl chloride homopolymer or a copolymer of vinyl chloride with an unsaturated monomer.

27. The halogen-containing polymer composition of Claim 26 wherein the unsaturated monomers are selected from the group consisting of alpha olefins, acrylic acid, vinyl monomers, maleates and combinations thereof.

20 28. The halogen-containing polymer composition of Claim 25 wherein the oil of the microemulsion is a paraffinic oils having a boiling point higher than about 170°C.

25 29. The halogen-containing polymer composition of Claim 25 wherein the microemulsion further comprises an organic material which is readily soluble or miscible with the oil.

30. The halogen-containing polymer composition of Claim 29 wherein the organic material is selected from the group consisting of substituted aromatic hydrocarbons, unsubstituted aromatic hydrocarbons and ethoxylated alcohols.

31. The halogen-containing polymer composition of Claim 25 wherein
5 in the microemulsion the equivalent ratio of basic metal compound to aliphatic acid is about 1 to about 10.

32. The halogen-containing polymer composition of Claim 25 wherein the aliphatic acid of component (a) of the microemulsion is selected from the group consisting of caprylic acid, capric acid, lauric acid, myristic acid, myristoleic acid,
10 decanoic acid, dodecanoic acid, pentadecanoic acid, palmitic acid, palmitoleic acid, margaric acid, stearic acid, 12-hydroxystearic acid, oleic acid, ricinoleic acid, linoleic acid, arachidic acid, gadoleic acid, cicosadienoic acid, behenic acid, crucic acid, tall oil fatty acid, rapeseed oil fatty acid, linseed oil fatty acid and mixtures thereof.

33. The halogen-containing polymer composition of Claim 25 wherein
15 component (b) of the microemulsion is selected from the group consisting of glycerin, glycerol monooleate, ethylene glycol, diethylene glycol, triethylene glycol, propylene glycol, dipropylene glycol, tripropylene glycol, diethylene glycol monobutyl ether, triethanolamine, diethanolamine and ethanolamine.

34. The halogen-containing polymer composition of Claim 25 wherein
20 component (c) is selected from the group consisting of sorbitol, pentaerythritol, sugar alcohols and mixtures thereof.

35. The halogen-containing polymer composition of Claim 25 wherein component (b) of the microemulsion is glycerin and component (c) is sorbitol.

36. The halogen-containing polymer composition of Claim 25 wherein component (b) of the microemulsion is triethanolamine and component (c) is an ethoxylated alcohol.

37. The halogen-containing polymer composition of Claim 25 wherein
5 in the microemulsion the metal carbonate/carboxylate of component (a) is obtained from calcium hydroxide and zinc oxide, the aliphatic acid of component (a) is oleic acid or tall oil fatty acid, component (b) is glycerin and component (c) is sorbitol.

38. The halogen-containing polymer composition of Claim 25 is combined with at least one other additive.

10 39. The halogen-containing polymer composition of Claim 38 wherein the additive is selected from the group consisting of fillers, metal carboxylates, diketones, phosphites, antioxidants, lubricants, plasticizers, impact modifiers, radical scavengers, process aids and pigments.

40. A food grade article of manufacture comprising the halogen-
15 containing polymer composition of Claim 25.

41. A food grade article of manufacture comprising the halogen-
containing polymer composition of Claim 35.

42. A food grade article of manufacture comprising the halogen-
containing polymer composition of Claim 36.

20 43. A process for preparing a halogen-containing polymer composition having low fogging characteristics comprising the step of reacting simultaneously or sequentially a halogen-containing polymer and a heat stabilizing

effective amount of a microemulsion comprising:

a) an overbased metal carbonate/carboxylate obtained from the reaction of an oxide and/or hydroxide of a metal selected from the group consisting of sodium, potassium, calcium, magnesium, zinc and mixtures thereof and an aliphatic acid in which the aliphatic moiety contains up to about 30 carbon atoms and carbon dioxide in an oil;

b) one or more non-phenolic compounds having about two or about three hydroxyl groups; and,

c) one or more polyols, alcohol ethoxylates and/or alcohol propoxylates having from about 6 to about 24 carbon atoms in the alcohol and 0 to 3 ethylene oxide units and/or 0 to 3 propylene oxide units.

44. The process of Claim 43 wherein the halogen-containing polymer is a polyvinyl chloride homopolymer or a copolymer of vinyl chloride with an unsaturated monomer.

45. The process of Claim 44 wherein the unsaturated monomers are selected from the group consisting of alpha olefins, acrylic acid, vinyl monomers, maleates and combinations thereof.

46. The process of Claim 43 wherein the oil of the microemulsion is a paraffinic oils having a boiling point higher than about 170°C..

47. The process of Claim 43 wherein in the microemulsion the equivalent ratio of basic metal compound to aliphatic acid is about 1 to about 10.

48. The process of Claim 44 wherein the aliphatic acid of component (a) of the microemulsion is selected from the group consisting of caprylic acid, capric acid, lauric acid, myristic acid, myristoleic acid, decanoic acid, dodecanoic acid, pentadecanoic acid, palmitic acid, palmitoleic acid, margaric acid, stearic acid, 12-

hydroxystearic acid, oleic acid, ricinoleic acid, linoleic acid, arachidic acid, gadoleic acid, cicosadienoic acid, behenic acid, crucic acid, tall oil fatty acid, rapeseed oil fatty acid, linseed oil fatty acid and mixtures thereof.

5 49. The process of Claim 44 wherein component (b) of the microemulsion is selected from the group consisting of glycerin, glycerol monooleate, ethylene glycol, diethylene glycol, triethylene glycol, propylene glycol, dipropylene glycol, tripropylene glycol, diethylene glycol monobutyl ether, triethanolamine, diethanolamine and ethanolamine.

10 50. The process of Claim 43 wherein component (c) is selected from the group consisting of sorbitol, pentaerythritol, sugar alcohols and mixtures thereof.

51. The process of Claim 43 wherein in the microemulsion the metal carbonate/carboxylate of component (a) is obtained from calcium hydroxide and zinc oxide, the aliphatic acid of component (a) is oleic acid or tall oil fatty acid, component (b) is glycerin and component (c) is sorbitol.

15 52. The process of Claim 43 wherein in the microemulsion the metal carbonate/carboxylate of component (a) is obtained from calcium hydroxide and zinc oxide, the aliphatic acid of component (a) is oleic acid or tall oil fatty acid, component (b) is triethanolamine and component (c) is an ethoxylated alcohol.